

at regular intervals from each other, then the rays, which emerge, and after reflection re-enter the same surface, will also be separated so as to present streaky appearances, in some of which the order of the colours will differ from that in others, agreeably to observation.

With respect to the curvature of the prismatic bows, *that* manifestly depends upon the position of the eye, as the lines of equal incidence form a cone, of which the eye is apex; and, accordingly, as the eye recedes from the prism, the bow becomes less curved, and for a small space will appear straight.

Dr. Herschel having remarked, when a plane surface is applied to a prism, that the appearance of the streaks that are seen in contact with the prismatic bow depends on what he has termed the critical separation of the rays, infers, that those rings of colours which are seen when a lens is laid upon a plane surface, depend also upon the same critical separation; the lens being in this case considered as a prism bent round into a circular form.

The several points of resemblance in the circumstances under which the bow-streaks from a prism, and the rings from contact of lenses, appear or disappear, or change their form or their colours, are next compared; and are considered by the author as decisive proof that each arise from the same critical separation at the boundary of prismatic reflection; and if the mere difference of refrangibility of the several colours is sufficient to account for the phenomena, it is inferred, that no alternate fits of easy reflection and easy transmission really exist as original properties in the rays of light.

An Account of a Calculus from the Human Bladder of uncommon Magnitude. By Sir James Earle, F.R.S. Read June 15, 1809. [*Phil. Trans.* 1809, p. 303.]

This calculus, which is considered as the largest on record, weighs 44 ounces avoirdupois. It was taken after death from the bladder of Sir James Ogilvie, who had submitted to a fruitless attempt to remove it by the usual operation of lithotomy, rather than prolong an existence extremely miserable from this among other consequences of a blow on his back thirty years before. The stone so completely filled the cavity of the bladder, that it was with difficulty taken out, although there was no real adhesion. Its texture was less compact than that of calculi in general, but agreed in appearance with that species which has been called the Fusible Calculus; and it was ascertained by Dr. Powel to contain the same ingredients as it was composed of, the ammoniacal phosphate of magnesia, with phosphate of lime.

On expectorated Matter. By George Pearson, M.D. F.R.S. Read June 15, 1809. [*Phil. Trans.* 1809, p. 313.]

Dr. Pearson's inquiry comprehends several varieties of expectorated matter, which he arranges under the following heads:

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1. That which is semi-transparent blueish, and of the consistence of jelly.

2. What is transparent and fluid, as mucilage.

The 3rd is thick, opaque, and straw-coloured, or white, and very tenacious.

4. Puriform matter secreted without breach of surface.

5. Matter consisting of the mixture of the 2nd and 3rd, or 2nd and 4th varieties.

6. Pus from vomicae, arising from tubercles.

7. Pus from vomicae, consequent on simple inflammation.

The author next treats more at large of the sensible or obvious properties, including smell, taste, weight relative to water, and appearance under the microscope.

The next division of the subject includes the agency of heat; the separation of a coagulum, or curd, at temperatures from 150° to 170° ; the properties of the curd, and of the residuum which it leaves when burned; the saline contents of the fluid separated from the curd, and obtained by evaporation.

Under the same head of agency of heat is also included the process of distillation to dryness, the properties of the fluid distilled, and of the residuum.

The action of alcohol is next tried, both on the residuum left by distillation, and also on different kinds of expectorated matter in their fresh state.

Next follow experiments on the miscibility of these matters with water, and also a set of experiments made with acetous acid. After other miscellaneous experiments, the author concludes, that the various kinds of expectorated matter consist of the same ingredients, but that the proportion of these ingredients is somewhat different; that expectorated matter consists of water containing certain saline and earthy bodies, together with a coagulable albuminous oxide, amounting in general to between one sixteenth and one twentieth of the whole, but sometimes not exceeding one fiftieth part, and at others amounting to as much as one tenth.

The saline ingredients are stated to be,

Muriate of soda, varying from 1 to 2 in 1000 parts.

Potash, neutralized by animal oxide, 0.4 to 0.7.

Phosphate of lime, 0.4 to 0.5.

Ammonia, united probably to phosphoric acid.

Phosphate, perhaps of magnesia.

Carbonate of lime.

Indications of sulphate of lime.

Vitrified matter, perhaps with silica.

Oxide of iron in too small proportion to be estimated.

The last six substances scarcely amounting to one thousandth part.

The different consistence is ascribed to the different quantities of albuminous oxide. The thicker matter is also said to be less saline than that which is more fluid.

The author observes, that all the animal fluids contain potash, but

that pus does not contain so much potash or muriate of soda as is contained in the above expectorated secretions.

Dr. Pearson also thinks it much more probable that the circulating and secreted fluids are impregnated with potash, as he has observed, than with soda, as observed by others.

Finally, we are informed, that expectorated matter contains globules, which have not before been observed, and seem to the author to denote organization.

On the Attractions of homogeneous Ellipsoids. By James Ivory, A.M. Communicated by Henry Brougham, Esq. F.R.S. Read June 15, 1809. [Phil. Trans. 1809, p. 345.]

The theory of the figures of the planets involves two questions perfectly distinct from each other; first, the *figure* which a mass of matter would assume by the mutual attraction of its particles, combined with a centrifugal force, arising from rotatory motion; and secondly, the *force* with which a body so formed will attract a particle occupying any proposed situation. The latter is the subject of the present inquiry; and it is also limited to the consideration of homogeneous bodies bounded by finite surfaces of the second order.

This subject was first partially treated of by Sir Isaac Newton, who, in determining the attraction of spherical bodies, has also treated of the other solids, formed by the rotation of curves round an axis, and of the attractions they exert upon bodies placed in the line of their axes. MacLaurin was the first who determined the attractions that such spheroids of revolutions exert on particles placed anywhere, either *in* or *within* their surfaces.

Le Gendre extended the same inquiry to particles *without* the surface of such solids of revolution.

La Place took a more enlarged view, and extended his researches to all elliptic spheroids, not formed by revolution, but such whose three principal sections are all elliptical; and he arrived at conclusions, with regard to them, similar to those of MacLaurin and Le Gendre.

But notwithstanding the ingenuity and skill displayed by La Place in this investigation, Mr. Ivory conceived that the inquiry might be simplified, and the results obtained more directly, by a method which forms the subject of the present communication; which, however, is of a nature not adapted for public reading.

Observations on Albumen, and some other Animal Fluids; with Remarks on their Analysis by electro-chemical Decomposition. By Mr. William Brande, F.R.S. Communicated by the Society for the Improvement of Animal Chemistry. Read June 15, 1809. [Phil. Trans. 1809, p. 373.]

Mr. Brande's paper consists of two parts; first, Observations on mucus and on the composition of liquid albumen; and secondly, On the composition of some animal fluids containing albumen.